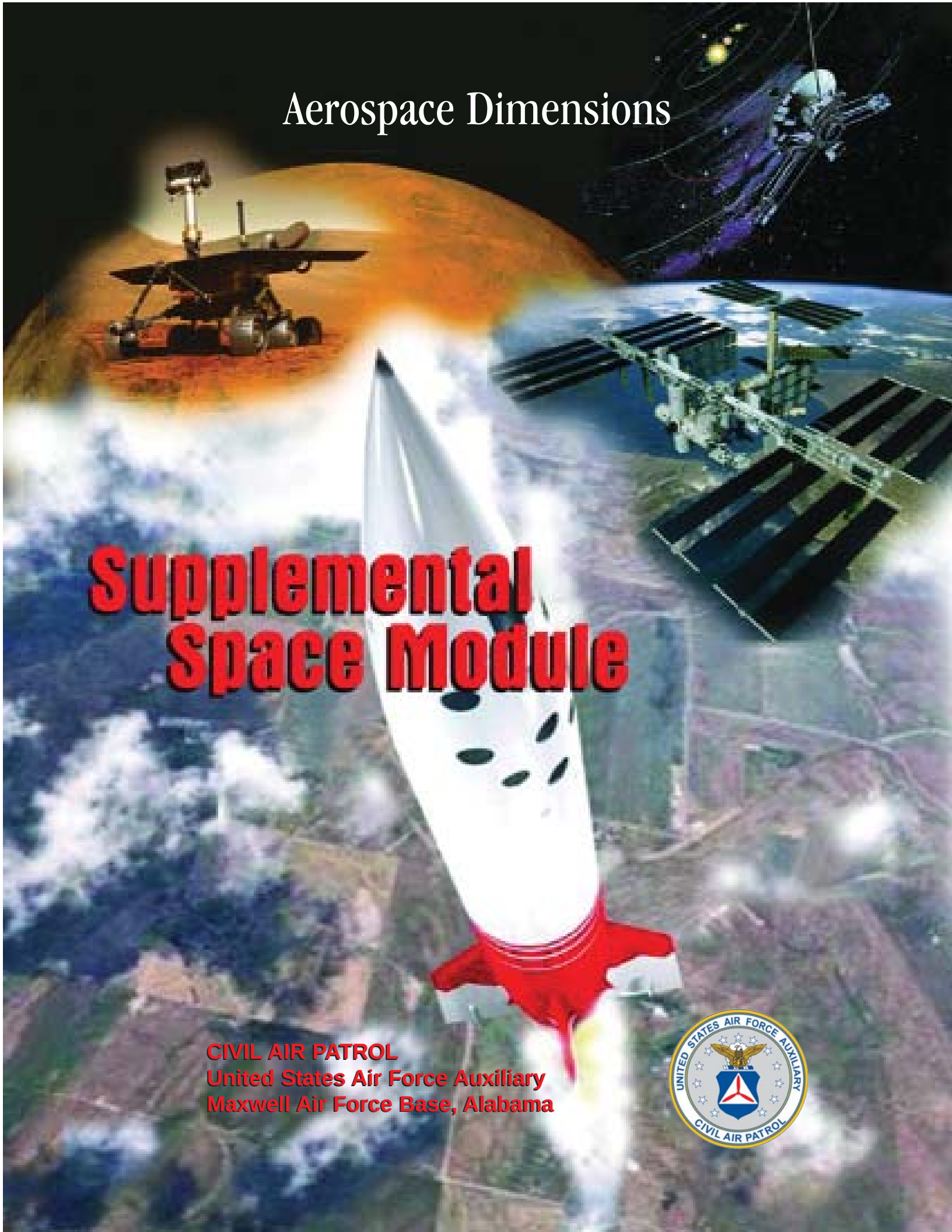
Aerospace Dimensions



# Supplemental Space Module

CIVIL AIR PATROL
United States Air Force Auxiliary
Maxwell Air Force Base, Alabama

# Acknowledgments

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Thanks also go to Col Mike McNeely and CAP Col Drew Alexa for their expertise and dedication to CAP and to ensuring STK being properly included in this module. A special thanks goes to CAP C/COL Andrew Shepherd for dedicating his time and considerable talents to this project.

Finally, I want to thank the leadership team at National Headquarters CAP for their vision and support. For this project that team consisted of Judy Rice, Deputy Director of Aerospace Education; Jim Mallett, Director, Leadership Development and Membership Services; and Colonel Al Allenback, Executive Director, CAP. Without their talents, understanding, and dedication to aerospace education this module could not have been produced.

*Jeff Montgomery*
Project Manager

# Introduction

This module discusses current space information and is designed to be a supplement to the six modules of Aerospace Dimensions. This module provides the reader with an up-to-date look at some intriguing topics that are very relevant in today's discussions of space. In a few cases, this module elaborates on subjects mentioned in Aerospace Dimensions modules 5 and 6. At other times, this module covers new and exciting topics that we hope you will enjoy. Studying this supplemental module is not required for promotion within the cadet ranks of CAP. This module simply consists of some of the hottest topics relating to space and provides some of the latest information available.

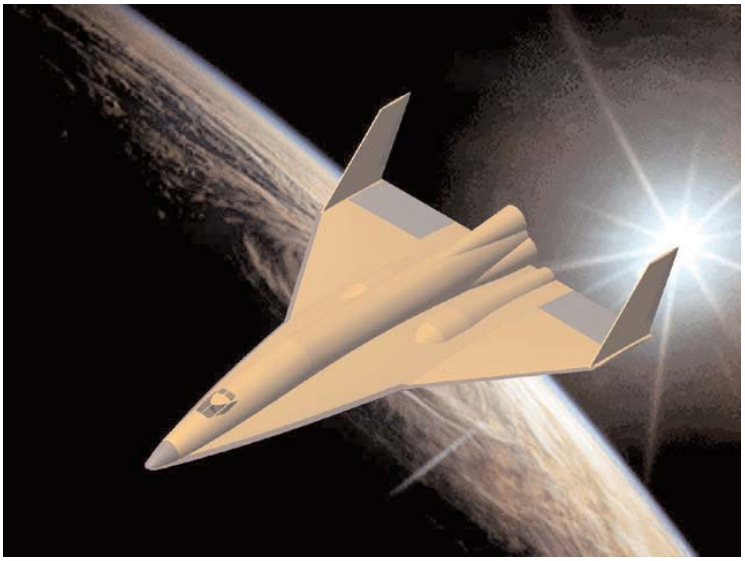
The module is divided into five chapters covering five main subjects. We begin with X PRIZE, which is a $10 million space-travel competition to boost space tourism. Next, we discuss satellites and Satellite Tool Kit (STK). We devote time to orbits and trajectories and the wonderful technology of STK. Then we discuss the history and current status of the International Space Station. We approach the Mars chapter in a similar way, including discussing the very latest explorations to Mars. Finally, we conclude with a look at astronomy and the latest scientific discoveries in space. It is our hope that these diverse subjects will give the reader a current and accurate perception of where America is today with regard to space, and a glimpse of where we might be headed in the future.

We included some hands-on activities, which we hope you will enjoy and also find stimulating and educational. They are listed in the back of each chapter. We also included some links to web sites that provide more in-depth knowledge and sophistication.

Whether you study all five chapters or only a few, we hope you find this module to be informative, interesting, educational, and worthy of your time.

# Contents






## Chapter 1 - X PRIZE

After completing this chapter, you should be able to:
- Define X PRIZE.
- Describe the mission of X PRIZE.
- State some reasons for why X PRIZE was created.
- Identify some of the teams that are competing.
- Explain how the prize can be won.
- Describe some of the benefits to be derived from X PRIZE.

## Chapter 2 - Satellites and Satellite Tool Kit

After completing this chapter, you should be able to:
- Define an orbit.
- Describe different orbits.
- Discuss the Hubble Telescope's contributions.
- Define STK.
- Describe how STK can be used.
- Apply STK technology to predict satellites passes.

## Chapter 3 - International Space Station (ISS)

After completing this chapter, you should be able to:
- Explain some of the research to be conducted on the ISS.
- Describe the living conditions on ISS.
- Name the nations involved with ISS.
- State the purpose of ISS.
- Describe the current status of ISS.
- Estimate a timetable for completion.
- Identify some uses for the ISS.


## Chapter 4 - Mars

After completing this chapter, you should be able to:

- State facts about Mars' environment.
- Describe reasons for scientists' interest in Mars.
- Identify earlier missions to Mars and what they accomplished.
- Describe future missions to Mars.

## Chapter 5 - Astronomy

After completing this chapter, you should be able to:

- Identify some of the latest space discoveries.
- Discuss any new planetary discoveries.
- Discuss latest findings concerning stars.

# National Science Standards

## Chapter 1 - X PRIZE

Content Standard A:  Science as Inquiry
- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry

Content Standard E:  Science and Technology
- Abilities of technological design
- Understandings about science and technology

Content Standard F:  Science in Personal and Social Perspectives
- Science and technology in local, national, and global challenges

Content Standard G:  History and Nature of Science
- Science as a human endeavor
- Nature of scientific knowledge
- Historical perspectives

Unifying Concepts and Processes
- Evidence, models, and explanation
- Form and function

## Chapter 2 - Satellites and Satellite Tool Kit

Content Standard B:  Physical Science
- Motions and forces
- Interactions of energy and matter

Content Standard D:  Earth and Space Science
- Energy in the earth system
- Origin and evolution of the earth system
- Origin and evolution of the universe

Content Standard E:  Science and Technology
- Abilities of technological design
- Understandings about science and technology

# National Science Standards

*Content Standard F:  Science in Personal and Social Perspectives*

- Science and technology in local, national, and global challenges

*Content Standard G:  History and Nature of Science*

- Science as a human endeavor
- Nature of scientific knowledge

*Unifying Concepts and Processes*

- Evidence, models, and explanation
- Constancy, change, and measurement
- Form and function

## Chapter 3 - International Space Station

*English Language Arts*

1. Reading for Perspective
3. Evaluation Strategies
4. Communication Skills
5. Communication Strategies
6. Applying Knowledge
8. Developing Research Skills

12.. Applying Language Skills

*Science*

*Content Standard A: Science as Inquiry*

- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

*Content Standard B: Life Science*

- Behavior of organisms

*Content Standard E: Science and Technology*

- Understandings about science and technology

*Content Standard F: Science in Personal and Social Perspectives*

- Personal and community health
- Science and technology in local, national, and global challenges

*Content Standard G: History and Nature of Science*

- Science as a human endeavor

# National Science Standards

Social Studies

3. People, Places, and Environment
4. Individual Development and Identity
8. Science, Technology, and Society
9. Global Connections

Technology

*Standard 8: Students will develop an understanding of the attributes of design.*

*Standard 11: Students will develop abilities to apply the design process.*

## Chapter 4 - Mars

Science

*Content Standard A: Science as Inquiry*

- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry

*Content Standard B: Physical Science*

- Motions and forces

*Content Standard E: Science and Technology*

- Abilities of technological design
- Understandings about science and technology

*Content Standard G: History and Nature of Science*

- Nature of scientific knowledge
- Unifying Concepts and Processes
- Evidence, models, and explanation

## Chapter 5 - Astronomy

*Content Standard A: Science as Inquiry*

- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry

*Content Standard B: Physical Science*

- Structure and properties of matter
- Interactions of energy and matter

# National Science Standards

*Content Standard D: Earth and Space Science*

- Energy in the earth system
- Origin and evolution of the earth system
- Origin and evolution of the universe

*Content Standard E: Science and Technology*

- Understandings about science and technology

*Content Standard F: Science in Personal and Social Perspectives*

- Science and technology in local, national, and global challenges

*Content Standard G: History and Nature of Science*

- Nature of scientific knowledge

*Unifying Concepts and Processes*

- Systems, order, and organization
- Evidence, models, and explanation
- Constancy, change, and measurement
- Evolution and equilibrium